1086-37-2696 **Mickael D. Chekroun*** (mchekroun@atmos.ucla.edu), 405 Hilgard Ave/7127 Math Sciences Bldg, Los Angeles, CA 90095, and **David Neelin**, **Dmitri Kondrashov**, **James McWilliams** and **Michael Ghil**. *Rough parameter dependence in geophysical fluid models: The role of Ruelle resonances.* Preliminary report.

Based on the spectral theory of chaotic and dissipative dynamical systems, we argue that the time variability of recurrent large-scale patterns — typically simulated by geophysical fluid models — plays a potentially key role in the sensitive parameter dependence of long-term statistics of such models. The cornerstone of our approach consists of interpreting this variability in terms of Ruelle-Pollicott (RP)-resonances which encode crucial information about the nonlinear dynamics of the model. A new approach for estimating RP resonances — as filtered through observables of the system — will be also presented. This approach relies on appropriate representations of the dynamics by Markov operators which are adapted to a given observable. It will be shown — on an El Nino-Southern Oscillation (ENSO) model of intermediate complexity — that the model statistics are the most sensitive for the smallest spectral gaps of the associated Markov operator; such small gaps turn out to correspond to regimes where peaks in the power spectrum are the most energetic, while correlations decay more slowly. Theoretical arguments will be provided to discuss the possible generalizations of this work to more realistic climate simulations obtained with general circulation models (GCMs). (Received September 25, 2012)